

Preliminary Amendment  
PCT No. AU2004/000637  
Filed: November 14, 2005  
Sughrue Ref: Q91511

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

Claim 1 (original): A method of detecting particles including emitting a beam of radiation into a monitored region and detecting a variation in images of the region indicating the presence of the particles.

Claim 2 (original): A method as claimed in claim 1 including modulating the beam of radiation.

Claim 3 (original): A method as claimed in claim 2, wherein scattered radiation within the zone is represented in one or more segments of a corresponding image, which allows for the location of the particles in the region to be identified.

Claim 4 (currently amended): A method as claimed in claim 43, wherein the location of the particles is determined in accordance with a geometric relationship between the locations of a source of emitted radiation, a direction of the emitted radiation and a point of image detection wherein, the geometric relationship is determined from the images.

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Claim 5 (currently amended): A method as claimed in ~~any one of the preceding~~  
~~claims~~claim 1, wherein the detected variation is an increase in scattered radiation intensity.

Claim 6 (currently amended): The method as claimed in claim ~~6~~5, wherein the  
increase is assessed with reference to a threshold value.

Claim 7 (currently amended): The method as claimed in claim ~~7~~6, wherein the  
threshold value is calculated by averaging integrated intensity values from the images.

Claim 8 (currently amended): The method as claimed in claim ~~7 or 8~~, comprising  
assigning different threshold values for different spatial positions within the region.

Claim 9 (currently amended): A method as claimed in ~~any one of the preceding~~  
~~claims~~claim 1, comprising directing the radiation along a path and identifying a target in the  
images, the target representing a position at which the radiation is incident on an objective  
surface within the region.

Claim 10 (currently amended): A method as claimed in claim ~~10~~9, wherein a  
location of the target in the images is monitored and the emission of radiation is ceased in  
response to a change in the location of the target.

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Claim 11 (currently amended): A method as claimed in ~~any one of the preceding~~  
~~claims~~claim 1, comprising identifying a location of an emitter in the images.

Claim 12 (currently amended): A method as claimed in claim ~~12~~11, comprising  
determining an operating condition of the emitter based on radiation intensity at the identified  
location of the emitter.

Claim 13 (currently amended): A method as claimed in ~~any one of the preceding~~  
~~claims~~claim 1, wherein the images are processed as frames which are divided into sections which  
represent spatial positions within the monitored region.

Claim 14 (currently amended): A method as claimed in claim ~~14~~13, comprising  
monitoring intensity levels in associated sections of the images and assigning different threshold  
values for different spatial positions within the region which correspond to the associated  
sections.

Claim 15 (original): Apparatus for monitoring a region, comprising:  
an emitter for directing a beam of radiation comprising at least one predetermined  
characteristic into the region;

an image capture device for obtaining at least one image of the region; and  
a processor for analysing the at least one image to detect variation of the at least one characteristic between the images, indicating presence of particles within the region.

Claim 16 (currently amended): Apparatus as claimed in claim ~~16~~15, where the processor is adapted to determine the location of particles in accordance with a geometric relationship between the locations of the emitter, the directed beam of radiation and the image capture device wherein, the geometric relationship is determined from the analysed images.

Claim 17 (currently amended): Apparatus as claimed in claim ~~16 or 17~~, comprising a plurality of emitters, arranged to direct radiation along different respective beam paths.

Claim 18 (currently amended): The apparatus as claimed in claim ~~18~~15, further comprising one or more filters for adapting the image capture device to capture radiation from the emitter in preference to radiation from other sources.

Claim 19 (currently amended): The apparatus as claimed in claim ~~19~~18, wherein one of the filters is a temporal filter.

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Claim 20 (currently amended): The apparatus as claimed in claim ~~1~~18, wherein one of the filters is a spatial filter.

Claim 21 (currently amended): The apparatus as claimed in claim ~~1~~18, wherein one of the filters is a band-pass filter.

Claim 22 (currently amended): The apparatus as claimed in claim ~~1~~18, wherein one of the filters is a polarising filter.

Claim 23 (currently amended): The apparatus as claimed in ~~any one of claims claim~~  
~~156 to 23~~, wherein the image capture device comprises an attenuator.

Claim 24 (currently amended): The apparatus as claimed in claim ~~24~~23, wherein the attenuator comprises a variable aperture device.

Claim 25 (currently amended): The apparatus as claimed in ~~any one of claims claim~~  
~~156 to 25~~, comprising a plurality of image-capturing devices.

Claim 26 (currently amended): The apparatus of ~~any one of claims claim~~ ~~156 to 26~~, wherein the image capture device comprises a camera.

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Claim 27 (currently amended):      The apparatus of ~~any one of claims claim 156 to 27~~,  
wherein the emitter comprises a laser.

Claim 28 (original):    A method of detecting particles comprising the steps of  
determining a path of a beam of radiation comprising placing a first image capturing device to  
view a source of the radiation and at least a part of the path of the beam of radiation;  
communicating the position of the source to a processor; placing a second image capturing  
device to view an impact point of the beam of radiation; communicating related position  
information of the impact point to the processor; determining the path of the beam in accordance  
with a geometric relationship between the position of the source and the position information of  
the impact point.

Claim 29 (original):    A method of detecting particles comprising the steps of:  
determining a region of interest containing a path of a beam of radiation comprising locating a  
first point, being the position of a source of the beam, using an image capturing device; locating  
a second point being the intersection of the beam of radiation with a field of view of the image  
capturing device, determining the path of the beam in accordance with the first and second point;  
calculating a region of interest containing the determined beard path.

Claim 30 (currently amended): A method as claimed in claim ~~30~~29, wherein the step of locating a second point is performed with at least one substantially transparent probe.

Claim 31 (currently amended): A method as claimed in claim ~~31~~30, wherein the probe is removed from the beam path.

Claim 32 (original): A method of determining the level of smoke at one or more subregions in a region of interest comprising: directing a beam of radiation within the region, selecting a view of at least a portion of a path of the beam with an image capture device, determining the location of the source of the radiation relative to the image capture device, determining the direction of the beam relative to the image capture device, dividing the beam of radiation into segments, determining a geometric relationship between the segments and the image capture device, adjusting a level of light received by the image capture device of each segment so as to allow for the geometric relationship.

Claim 33 (currently amended): A method as claimed in claim ~~33~~32, wherein the segments comprise at least one pixel.

Claim 34 (currently amended): A method as claimed in claim ~~34~~32, wherein the segments are grouped to form the subregions for smoke detection,

Claim 35 (currently amended): Apparatus adapted to detect particles, said apparatus comprising processor means adapted to operate in accordance with a predetermined instruction set, said apparatus, in conjunction with said instruction set, being adapted to perform the method as claimed in ~~any one of claims 1 to 15 and 29 to 35~~claim 1.

Claim 36 (currently amended): A computer program product comprising; a computer usable medium having computer readable program code and computer readable system code embodied on said medium for detecting particles within a data processing system, said computer program product comprising; computer readable code within said computer usable medium for performing the method steps of ~~any one of claims 1 to 15 and 29 to 35~~claim 1.

Claim 37 (original): A method of detecting particles including emitting a beam of radiation into a monitored region and detecting a variation in images of the region indicating the presence of the particles comprising assigning different threshold values for different spatial positions within the region.

Claim 38 (original): A method as claimed in claim 37 including modulating the beam of radiation.



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Claim 39 (original): A method as claimed in claim 38, wherein scattered radiation within the zone is represented in one or more segments of a corresponding image, which allows for the location of the particles in the region to be identified.

Claim 40 (original): A method as claimed in claim 39, wherein the location of the particles is determined in accordance with a geometric relationship between the locations of a source of emitted radiation, a direction of the emitted radiation and a point of image detection wherein, the geometric relationship is determined from the images.

Claim 41 (currently amended): A method as claimed in ~~any one of the preceding claims~~claim 1, wherein the detected variation is an increase in scattered radiation intensity.

Claim 42 (original): The method' as claimed in claim 5, wherein the increase is assessed with reference to a threshold value.

Claim 43 (currently amended): The method as claimed in claim ~~42~~6, wherein the threshold value is calculated by averaging integrated intensity values from the images.

Claim 44 (currently amended): A method as claimed in claim 1~~any one of the preceding claims~~, comprising directing the radiation along a path and identifying a target in the

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images, the target representing a position at which the radiation is incident on an objective surface within the region.

Claim 45 (currently amended): A method as claimed in claim ~~449~~, wherein a location of the target in the images is monitored and the emission of radiation is ceased in response to a change in the location of the target.

Claim 46 (currently amended): A method as claimed in ~~any one of the preceding claims~~ claim 1, comprising identifying a location of an emitter in the images.

Claim 47 (original): A method as claimed in claim 11, comprising determining an operating condition of the emitter based on radiation intensity at the identified location of the emitter.

Claim 48 (currently amended): A method as claimed in ~~any one of the preceding claims~~ claim 1, wherein the images are processed as frames which are divided into sections which represent spatial positions within the monitored region.

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Claim 49 (original): A method as claimed in claim 13, comprising monitoring intensity levels in associated sections of the images and assigning different threshold values for different spatial positions within the region which correspond to the associated sections.

Claim 50 (original): Apparatus for monitoring a region, comprising:  
an emitter for directing a beam of radiation comprising at least one predetermined characteristic into the region;  
an image capture device for obtaining at least one image of the region; and  
a processor for analysing the at least one image to detect variation of the at least one characteristic between the images, indicating presence of particles within the region.

Claim 51 (currently amended): Apparatus as claimed in claim ~~46~~50 where the processor is adapted to determine the location of particles in accordance with a geometric relationship between the locations of the emitter, the directed beam of radiation and the image capture device wherein, the geometric relationship is determined from the analysed images.

Claim 52 (currently amended): Apparatus as claimed in claim ~~50~~16 or 17, comprising a plurality of emitters, arranged to direct radiation along different respective beam paths.

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Claim 53 (currently amended):      The apparatus as claimed in claim ~~18~~50, further comprising one or more filters for adapting the image capture device to capture radiation from the emitter in preference to radiation from other sources.